Amend claim 1 to read

1. (amended) A method of characterizing a skin lesion wherein the absorption and scattering of light in different spectral bands by the skin lesion is a function of the condition of the skin, the method comprising:

illuminating a portion of the skin including the region of interest by light in at least three spectral bands, one of which is a blue spectral band;

digitally imaging a portion of the skin including the region of interest at the at least three spectral bands with the light re-emitted by the portion of the skin to generate digital images comprising digital signals whose values are a function of the condition of the region of interest of the skin; and

providing the digital images to a processor, wherein the processor:

segments the digital image by generating a single segmentation mask defining the boundary of the region of interest for each image from [a]the digital image in the blue spectral band, without operator intervention;

automatically computes at least one estimated value for each digital image at each spectral band which is a function of a characteristic of the portion of the region of interest determined by the segmentation mask, without operator intervention;

characterizes the condition of the skin as malignant or benign based on the estimated values, without operator intervention; and

outputs the characterization of the condition of the skin

Amend claim 6 to read

6. (amended) The method of claim 1, further comprising estimating at least one value which is a function of the asymmetry of the region of interest in each spectral band, for two principal axes of the segmented image by:

[locating the principal axes by computing an orientation angle;

computing the intensity centroid;

rotating the digital image such that the principal axes are parallel to the image axes; and

estimating the asymmetry values for each principal axis based on the intensity centroid; and

summing the estimated asymmetry value for the two principal axes.]

determining the principal axes of the segmented image;

rotating the principal axes of the segmented image until they are oriented parallel to the coordinate axes of the image;

computing the differences in intensity between each pair of pixels whose locations, with respect to a principal axis, are mirror images of each other;

summing the absolute values of said intensity differences;

calculating asymmetry values with respect to each principal axis, by normalizing the said sum to the total intensity in the segmented images; and

adding together the asymmetry values calculated for the two principal axes.

Amend claim 14 to read

14. (amended) A method of characterizing the condition of a region of interest of skin, wherein the absorption and scattering of light in different spectral bands by the region of interest is a function of the condition of the skin, the method comprising:

illuminating a portion of the skin including the region of interest by light in at least three spectral bands;

digitally imaging the portion of the skin including the region of interest at the at least three spectral bands with the light re-emitted by the portion of the skin to generate digital images comprising digital signals whose values are a function of the condition of the region of interest of the skin; and

providing the digital images to a processor, wherein the processor:

segments the digital images by generating a single segmentation mask defining the boundary of the region of interest for each image, the segmentation mask generated from [a] the digital image acquired in that spectral band for which the imaged skin lesion has the largest area [in any one of the at least three spectral bands];

computes at least one estimated value for each digital image at each spectral band which is a function of a characteristic of the region of interest determined by the segmentation mask;

characterizes the condition of the region of interest of the skin based on the estimated values; and

outputs the characterization of the condition of the region of interest of the skin.

Amend claim 41 to read

41. (amended) The method of claim 14, wherein the characterizing step comprises comparing a weighted combination of [parameter] estimated values against a threshold value.

Amend claim 42 to read

42.(amended) The method of claim 41, wherein the condition of the region of interest to be characterized is the presence of a melanoma and weight coefficients for each [parameter] estimated value and the threshold value are selected to maximize specificity, under the constraint of [100%] a defined sensitivity to melanoma, on a representative set of training images.

Amend claim 44 to read

44.(amended) A system for characterizing the condition of a region of interest of skin, comprising:

a source of illumination of light in at least three spectral bands;

a camera for acquiring digital images of the region of interest based on the light re-emitted from the illuminated region of interest at each of the spectral bands, the digital image comprising digital signals whose values are a function of the condition of the region of interest;

memory for storing the digital images provided by the camera;

a digital processor programmed to perform the steps of:

segmenting the digital images stored in memory by generating a single segmentation mask from [a] the digital image of largest area in any one of the at least three spectral bands;

estimating at least one value for each digital image at each spectral band which is a function of the texture of the portion of the region of interest determined by the segmentation mask;

characterizing the condition of the skin based on the estimated values; and

outputting the characterization of the region of interest.

Add the following new claims

69. (New claim) A method of characterizing the condition of a region of interest of skin, wherein the absorption and scattering of light in different spectral bands by the region of interest is a function of the condition of the skin, the method comprising:

illuminating a portion of the skin including the region of interest by light in at least three spectral bands;

digitally imaging the portion of the skin including the region of interest at the at least three spectral bands with the light re-emitted by the portion of the skin to generate digital images comprising digital signals whose values are a function of the condition of the region of interest of the skin; and

providing the digital images to a processor, wherein the processor:

segments the digital images by generating a segmentation mask defining the boundary of the region of interest from a digital image in any one of the at least three spectral bands;

computes at least one estimated value which is a statistical measure of the deviation of the boundary of the region of interest from the boundary of an ellipse of the same area, aspect ratio, and orientation as the segmentation mask;

characterizes the condition of the region of interest of the skin based on the estimated values; and

outputs the characterization of the condition of the region of interest of the skin.

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69. (New claim) A method of characterizing the condition of a region of interest of skin, wherein the absorption and scattering of light in different spectral bands by the region of interest is a function of the condition of the skin, the method comprising:

illuminating a portion of the skin including the region of interest by light in at least three spectral bands;

digitally imaging the portion of the skin including the region of interest at the at least three spectral bands with the light re-emitted by the portion of the skin to generate digital images comprising digital signals whose values are a function of the condition of the region of interest of the skin; and

providing the digital images to a processor, wherein the processor:

segments the digital images by generating a segmentation mask defining the boundary of the region of interest from a digital image in any one of the at least three spectral bands;

computes at least one estimated value of a statistical measure of the gradient values of the intensity of the digital images across the border of the segmented images;

characterizes the condition of the region of interest of the skin based on the estimated values; and

outputs the characterization of the condition of the region of interest of the skin.

70. (New claim) A method of characterizing the condition of a region of interest of skin, wherein the absorption and scattering of light in different spectral bands by the region of interest is a function of the condition of the skin, the method comprising:

illuminating a portion of the skin including the region of interest by light in at least three spectral bands;

digitally imaging the portion of the skin including the region of interest at the at least three spectral bands with the light re-emitted by the portion of the skin to generate digital images comprising digital signals whose values are a function of the condition of the region of interest of the skin; and

providing the digital images to a processor, wherein the processor:

segments the digital images by generating a segmentation mask defining the boundary of the region of interest from a digital image in any one of the at least three spectral bands;

computes at least one estimated value based on the ratio of standard deviation of the areas of dermal papillae to their mean within the segmentation mask;

characterizes the condition of the region of interest of the skin based on the estimated values; and

outputs the characterization of the condition of the region of interest of the skin.

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71. (New claim) A method of characterizing the condition of a region of interest of skin, wherein the absorption and scattering of light in different spectral bands by the region of interest is a function of the condition of the skin, the method comprising:

illuminating a portion of the skin including the region of interest by light in at least three spectral bands;

digitally imaging the portion of the skin including the region of interest at the at least three spectral bands with the light re-emitted by the portion of the skin to generate digital images comprising digital signals whose values are a function of the condition of the region of interest of the skin; and

providing the digital images to a processor, wherein the processor:

segments the digital images by generating a segmentation mask defining the boundary of the region of interest from a digital image in any one of the at least three spectral bands;

computes at least one estimated value of the average and standard deviation of the thickness of rete ridges within the segmentation mask. for a digital image of the region of interest determined by the segmentation mask;

characterizes the condition of the region of interest of the skin based on the estimated values; and

outputs the characterization of the condition of the region of interest of the skin. for a digital image of the region of interest determined by the segmentation mask;

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72. (New claim) A method of characterizing the condition of a region of interest of skin, wherein the absorption and scattering of light in different spectral bands by the region of interest is a function of the condition of the skin, the method comprising:

illuminating a portion of the skin including the region of interest by light in at least three spectral bands;

digitally imaging the portion of the skin including the region of interest at the at least three spectral bands with the light re-emitted by the portion of the skin to generate digital images comprising digital signals whose values are a function of the condition of the region of interest of the skin;

calibrating each pixel location in the digital image in each spectral band with respect to stored images of a white target material having known diffuse reflectance, each of the stored images being an average of a plurality of images acquired at each spectral band, while the material undergoes continual in-plane motion; and

providing the digital images to a processor, wherein the processor:

segments the digital images by generating a segmentation mask defining the boundary of the region of interest from a digital image in any one of the at least three spectral bands;

computes at least one estimated value for each digital image at each spectral band which is a function of a characteristic of the region of interest determined by the segmentation mask;

characterizes the condition of the region of interest of the skin based on the estimated values; and

outputs the characterization of the condition of the region of interest of the skin.

73. (New claim) The method of claim 42, wherein the defined sensitivity to melanoma on a representative set of training images is 100% sensitivity.

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74. (New claim) The method of claim 1, where the characterization step is based on a non-linear combination of the estimated values.

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75. (New claim) The method of claim 1, where the characterization step is based on a linear combination of the estimated values.

76. (New claim) The method of claim 1, where the characterization step is based on a sequential combination of applying a linear combination of the estimated values and a non-linear combination of estimated values.

77. (New claim) The method of claim 14, where the characterization step is based on a non-linear combination of the estimated values.

78. (New claim) The method of claim 14, where the characterization step is based on a linear combination of the estimated values.

79. (New claim) The method of claim 14, where the characterization step is based on a sequential combination of applying a linear combination of the estimated values and a non-linear combination of estimated values.